

## Mesoporous Silicon Far Infrared Filters, Phase I

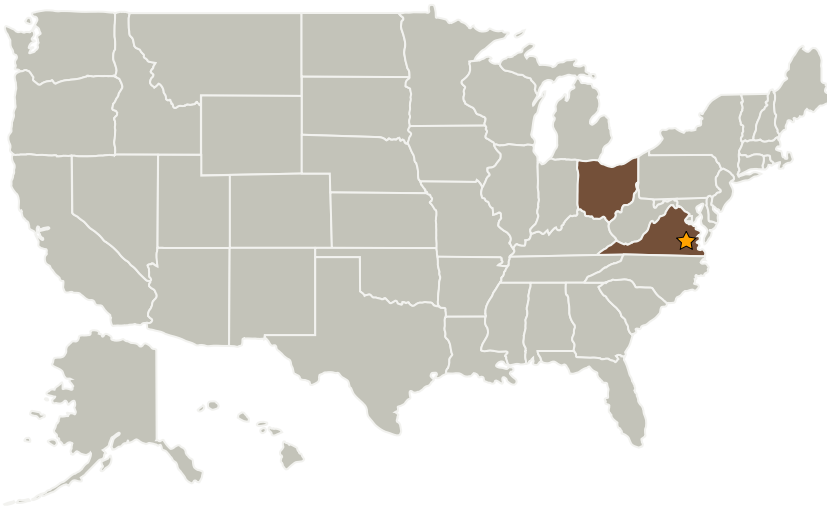
Completed Technology Project (2005 - 2005)



## Project Introduction

This SBIR Phase I proposal describes a novel method to make optical filters based on mesoporous silicon multilayers, for use at cold temperatures in the far infrared spectral region. This type of filter consists of a lattice of different porosity layers formed in monocrystalline silicon by electrochemical means. Due to the nature of the material, mesoporous silicon filters do not suffer from thermal, mechanical, and environmental instabilities. More over, due to the high transparency of the mesoporous silicon throughout a large part of the far IR range, such filters can be made for wavelengths far longer than those that can be addressed with conventional interference filter technology. They will considerably outperform filters based on metal meshes. Such filters are expected to impact astronomical, commercial, military and scientific communities in many filter applications. In Phase I, it is proposed to demonstrate the feasibility of the method by fabricating porous multilayers with ultrahigh thickness and to evaluate a sintering technique to enhance environmental stability. In Phase II, optimized filters will be fabricated and their properties compared with design predictions. Phase III will involve product design, fabricating filter structures to meet customers' physical as well as optical needs, and marketing and sales investments.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Langley Research Center (LaRC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Lake Shore Cryotronics, Inc.	Supporting Organization	Industry	Westerville, Ohio

Primary U.S. Work Locations	
Ohio	Virginia

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigators:**

Marc Christophersen

Xiaowei Xia

## Technology Areas

**Primary:**

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.1 Detectors and Focal Planes